REMARKS

The present invention is a method for determining the voicing of a speech signal segment and a device for determining the voicing of a speech signal segment. The method in accordance with the invention comprises dividing a speech signal segment into sub-segments as performed for example by segmentation function 106 of Fig. 1 and as illustrated in Fig. 2, determining a value relating to the voicing of respective speech signal sub-segments as determined for example by value determination function 110 of Fig. 1, comparing the values with a predetermined threshold and making a decision of the voicing of the speech segment based on the number values on one side of the threshold as performed, for example, by voice decision function 112 of Fig. 1. The decision operates with emphasis on at least one last sub-segment of the segment. See paragraphs [0010] and [0036] of the Substitute Specification and the Abstract. The original specification teaches, as set forth in paragraph [0010] of the Substitute Specification, "[t]his is done by emphasizing the voicing decisions of the last sub-segments in a frame to detect the transients from unvoiced to voiced speech...the frame is classified as voice also if all of a predetermined number of the last sub-segments have a normalized autocorrelation value exceeding the threshold value".

Moreover, a decision on the voicing of the speech segment may be based on the number of the values on one side of the threshold. See paragraph [0004] and the original claims.

Claims 1-3 and 8-10 stand rejected under 35 U.S.C. §102 as allegedly being anticipated by United States Patent 5,734,789 (Swaminathan). This ground of rejection is traversed for the following reasons.

In the Response to Arguments, the Examiner reasons with respect to claims 1 and 8 that "Swaminathan teaches the special processing of the last sub-frame by adjusting indices (column 16, lines 5-12) and uses a delayed decision approach (column 11, lines 47-55), which corresponds to 'emphasis on at least one last segment'." It is submitted that the Examiner's interpretation of adjusting indices is not a correct interpretation of "making a decision on the voicing of the speech segment based on the number of the values on one side of the threshold and with emphasis on at least one last sub-segment of the segment". Webster's American Collegiate Dictionary, ©1998 finds emphasis as "special stress or importance attached to something" or something that is given special stress or importance". It is submitted that adjusting indices as discussed in column 16 for the values M, N and L for the subframes with the values of M=2, N=1 and L=2 for the first subframe, for the last subframe M=2, N=2 and L=1 and for all other subframes M=2, N=2 and L=2, does not meet the limitation of "emphasis on the at least one last sub-segment of the segment" as recited in independent claims 1 and 8.

All that is described in the portion of Swaminathan at column 16, lines 5-12, on which the Examiner relies is that the values of N and M are optimum pitch gain indices and the value of L represents the best cumulative signal to noise ratio for the current 40 millisecond frame as the criteria. There is nothing in the explanation on which the Examiner relies which meets the foregoing limitation on emphasis on at least one last sub-segment of the segment at the end of claims 1 and 8.

Moreover, column 11, lines 47-55 of Swaminathan, describes deriving excitation model parameters employing an interpolated set of short term predictor coefficients in each subframe. The determination of the optimal set of excitation model parameters for each subframe which is described therein does not meet the claimed emphasis on at least one last sub-segment of the segment.

As stated in Webster's, emphasis is special stress or importance. The assigning of an optimal set of excitation model parameters described in column 11, lines 45-57, and the assigning of MN pitch gain indices for L best using cumulative signal to noise ratio for the current 40 millisecond frames for all of the sub-segments as described in column 16, lines 5-12, does not meet the claimed emphasis. Accordingly, it is submitted that Swaminathan does not anticipate claims 1-3 and 8-10.

Claims 4-7 and 11-14 stand rejected under 35 U.S.C. §103 as being unpatentable over Swaminathan in view of the Hess publication. Hess is cited as teaching "techniques for voicing determination where adjacent frames are checked and the decision is made using a medial smoother". Hess does not cure the deficiencies noted above with respect to Swaminathan not teaching emphasis on at least one last segment of the frame as recited in independent claims 1 and 8. Furthermore, the suggested modification of Swaminathan with Hess would not be made by a person of ordinary skill in the art for the reason that there is no reason why a person of ordinary skill in the art would be motivated to make the suggested modification except by impermissible hindsight. The Examiner alludes to the modification of Swaminathan in view of Hess as taking into account only knowledge which was within the level of ordinary skill at the time the claimed invention was

made and does not include knowledge going only from Applicants' disclosure. However, it is submitted that this is inconsistent with the record.

Newly submitted claims 15-42 have been added to further define the invention.

Independent claims 15 and 22 recite classifying the speech segment as voiced if a certain number of the values corresponding to at least one sub-segment of the segment is on one side of the threshold. In Section 4 of the Final Rejection, the Examiner alludes to Hess teaching techniques for voicing determination where adjacent frames are checked and the decision is made using a medial smoother. However, it is submitted that page 33, Section 2.1, paragraph 1, of Hess does not suggest to a person of ordinary skill in the art the aforementioned subject matter recited in independent claims 15 and 22. Moreover, in the discussion of Swaminathan, the Examiner acknowledges that Swaminathan does not make a decision "based on whether the values relating to voicing of substantially half of the sub-segments of the speech signal segment are on the one side of the threshold". Hess's reference to a medial smoother would not be understood by a person of ordinary skill in the art to cure this deficiency. Accordingly, it is submitted that the subject matter of claims 15 and 22 are patentable. Moreover, dependent claims 16-21 and 23-28 define more specific aspects of the present invention which are not rendered obvious by the proposed combination of Hess and Swaminathan.

Finally, newly submitted claims 29-42 define the making of a decision on voicing of the speech segment based on the number of values on one side of the threshold and with emphasis on at least one last sub-segment of the segment being used in the detection of unvoiced to voiced speech. Claims 29-42 are patentable for

the reasons set forth above with respect to claims 1-14. Moreover, claims 29-42 more specifically define the nature of the emphasis than recited in claims 1-14 in that it is recited as being "being used in the detection of unvoiced to voiced speech". This subject matter is neither anticipated by Swaminathan nor rendered obvious by the combination of Swaminathan and Hess for the reasons stated above and further, Swaminathan and Hess do not disclose emphasis being used to detect unvoiced to voiced speech.

In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (1200.39397X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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Attachments

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